

XXV. *A revision of the genus* *Æneis*. By HENRY JOHN ELWES, F.L.S., F.Z.S., President of the Entomological Society of London, and JAMES EDWARDS, F.E.S.*

[Read November 8th, 1893.]

PLATE XV.

IN accordance with the practice of the majority of European lepidopterists, we apply the name of *Æneis*, Hübner, to the group of insects here treated of, instead of *Chionobas*, Bdv., although it is quite clear that the former is a mere catalogue name. As W. H. Edwards says, in the 'Canadian Entomologist,' vol. xxi., p. 63, note:—"Perhaps the definition of the genus *Æneis* (and a definition is indispensable to recognition) was given by Mr. Scudder in 'Systematic Revision of the American Butterflies,' 1872; but *Chionobas*, Boisduval, 1832, has the priority."

The genus, by whichever name it is called, may well be regarded as an Arctic development of *Satyrus*, from which, however, all its members differ in the following particulars:—The costal vein only is inflated at the base; the antennæ are gradually widened to the apex, and do not form a more or less abrupt club; the intermediate tibiæ are considerably more than half as long as their tarsi; and the fore wing, especially in the males of the more typical species, has a characteristic pointed appearance, owing to the comparatively short inner margin, and the cell is comparatively long and narrow. The species are yellow-brown or grey-brown above, with a more or less distinct pale submarginal band, which bears from one to five roundish black spots or ocelli; brown, with a more or less distinct submarginal row of fulvous spots; or unicolorous smoke-brown, and in the latter case the wings have a very abraded appearance.

In characterising this genus a point has been made of the hairiness of the under side, *i. e.*, of the legs and hind

* For statements appearing in the first person singular I am alone responsible.—H. J. ELWES.

wings; but they are equalled in this respect by some species of *Satyrus*, *S. hermione*, for example.

The following types of clasp-form are found in this genus; in *norna* and *jutta* there is an unusual amount of individual variation, but the differences are merely those of degree, and are not, in the most extreme cases, sufficient to obscure the relationship of the species:—

1. Clasp oblong, more or less pointed at the apex, its upper edge bearing a single tooth or projection somewhere between the middle and the base.
ex. *chryxus*, *bore*, *taygete* (figs. 3, 10).
2. Clasp rather broadly triangular, and wanting the projection on the upper edge ex. *urda*, *uhleri* (fig. 1).
3. Clasp oblong, gradually narrowed; apex bluntly rounded or subtruncate; serrulation of the upper edge inconspicuous or absent ex. *hora*, *walkyria* (fig. 7).
4. Clasp not curving inwardly at the apex, which is bluntly rounded, and, together with the upper edge nearly or quite to the middle, bears unequal and comparatively large teeth.
ex. *semidea*, *jutta*, *fulla* (figs. 5, 9).
5. Clasp rather suddenly narrowed about the middle, strongly curved inwards at the apex; the teeth decumbent and almost confined to the upper apical angle, which is somewhat produced.
ex. *subhyalina*, *brucei*, *norna* (figs. 6, 13).

Eneis appears to be the most cold-enduring of all known genera of butterflies. With the exception of the aberrant *nevadensis* group there is not one species inhabiting a region in which the winters are not very long and severe, and usually of an Arctic character. About half the species are confined to high mountain regions, where they frequent stony and rocky ground above timber-line; another section, like *uhleri* and *alberta*, inhabit grassy steppes and prairies; a third, like *bore* and *subhyalina*, occur on the coasts of Arctic seas; and a few, such as *chryxus* and *nevadensis*, are inhabitants of mountain forests. Their larvæ, so far as known, are all grass-feeders, but most of them are unknown. Their geographical distribution is, if we except the almost unknown *Æ. antarcticus* from Patagonia, strictly confined to the Palæarctic region, in which I include, so far as Rhopalocera are concerned, the Nearctic region of Sclater.

As will be seen from the references below, the literature of the group is somewhat extensive; but it is for the

most part too scattered and fragmentary to be readily utilised by the student of to-day.

We have excluded the following species from our arrangement of the genus :—

Chionobas stretchii, W. H. Edw. (Trans. Am. Ent. Soc., iii., p. 192, 1870), which is the same as the *Hipparchia ridingsii* of the same author (Proc. Ent. Soc. Phil., iv., p. 201, 1865), and is figured by Strecker (Lep., pl. iv., fig. 6, ♀, 1873), is perhaps best treated as an aberrant *Æneis*, since the balance of its characters seem to be rather with that genus than with *Satyrus*. It has the antennæ and something of the facies of an *Æneis*, but the cell of the fore wing is comparatively wider, the lower surface of the hind wing wants the long upright hair, the intermediate tibiæ in the male are about half as long as the tarsi, and there seems to be a very feeble thickening of the basal portion of the median vein; but it has not the facies, the strongly clubbed antennæ, or the swollen base of the median vein found in typical *Satyrus*. It is true that its divergence both from *Æneis* and *Satyrus* is as great as that of some other genera of *Satyridæ* from each other; but if a separate generic name is required for it, that of *Neominois* has been provided by Scudder (Bulletin Buffalo Soc. Nat. Sci., ii., p. 241, 1875).

Chionobas pumilus, Feld., Reise Novara, Lep., iii., p. 490, pl. lxxix., figs. 6, 7, 1866, ♂; *ib.*, Elwes, P. Z. S., 1882, p. 404, pl. xxv., fig. 3; *Æneis pumilus*, Marsh. and de Nicé., Butt. Ind., i., p. 238, pl. xv., fig. 37, ♂; *Æneis?* (*Satyrus?*) *palearcticus*, Stgr., Stett. Ent. Zeit., 1889, p. 20; *Æneis pumilus* var. *lama*, Alphéraky, Rom. Mem. sur Léop., v., p. 80, 1889; *Æneis pumilus* var. *iole*, Leech, Butt. China, &c., p. 76, pl. xi., fig. 2, is unquestionably an *Aulocera*, Butl. (Ent. Mo. Mag., iv., p. 121). It possesses the peculiar wing-pattern and other characters proper to that genus, and, moreover, has the same type of clasp-form which is found in at least one species of *Aulocera*, and which is perhaps correlated to the wing-pattern found in that genus. Its superficial resemblance to *Aulocera brahminus* had already been remarked upon by Marshall and de Nicéville and Leech (*l. c.*). The type of this species was described from Ladak, where it is common on the dry plateaus at from 14,000 to 16,000 ft. I afterwards got specimens from the alpine valley of

Chumbi, on the frontiers of Sikkim (c. f. P. Z. S., 1882, l. c.). Though these specimens were on the average considerably darker than those from Ladak, I did not think it necessary to give them another name. Later, however, Dr. Staudinger described a form from Issyk-kul, which is hardly separable from the Sikkim form under the name of *palearcticus*, and gave mine the varietal name of *sikkimensis*. About the same time Alphéraky described the same or a similar form from Lob-Nor, in Northern Thibet, where it is found at as low an elevation as 3000 ft. Still more recently, Grum-Grshimailo collected, in the Koko-Nor district, specimens which differ in colour amongst themselves as much or more than the Ladak and Sikkim forms previously described, one in particular being as dark as the form named *iole* by Leech from Western China and East Thibet, and having the band on the upper side of both wings almost entirely absent. Considering the wide range of this species in Central Asia, and the small number of localities which have hitherto been explored, I do not think we are yet in a position to say how far any of these variations are locally constant, for, although *iole* is at first sight abundantly distinct from typical *pumilus*, the clasp-form is identical.

The *Chionobas argenteus* of Blanchard, in Gay's Fauna Chilena, pl. ii., figs. 9—11, and the *Arge williamsianus* of Butler (Cat. Sat. B. M., p. 159, pl. 4, fig. 1), have been improperly placed in this genus.

With the exceptions dealt with above, the following list includes all the species of *Æneis* at present described:—

ÆNEIS, *Hübner*, Verz. bek. Schmett. p. 50 (1816); Scudd. Butt. N. Am. i. p. 123 (1889).

CHIONOBAS, *Boisduval*, Icon. Hist. Léop. Eur. p. 182 (1832); Westw. Gen. Di. Lep. p. 381 (1851).

JUTTA, <i>Hübner</i> , Samml. Eur. Schmett. i. 25, figs. 614, 615, 1806—19 (<i>Papilio</i>).	<i>Eur. bor. from about 55° (in Livonia) to about 68° N.; Asia from about 50° N. to 68° N. (fide Trybom); Am. from 45° N. (Maine) to about 55° N. (Labrador).</i>
<i>Æneis jutta</i> , <i>Hübner</i> , Verz. Schmett. 58 (1816); <i>Holmgr.</i> Ent. tidskr. vii. 151—154, figs. (1886); <i>Scudder</i> , Butt. N. Eng. i. 149—156, figs. (1889).	
<i>Chionobas jutta</i> , <i>Möschler</i> , Wien. Ent. Monats. iv. 342 (1860); vii. 201 (1863); <i>Stett.</i> Ent. Zeit. xxi. 116—117 (1870);	

- Scudd. Proc. Ent. Soc. Phil. v. 3—5, fig. (1865); Pack. Guide Ins. 263, fig. 192 (1869); Mayn. Butt. N. E. 2—3, pl. 3, figs. 2, 2a (1886); Fyles, Can. Ent. xx. 131—133 (1888); Edw. Butt. N. A. ser. iii. pl. xiii. *Chionobas* v. fig. larvæ.
- Chionobas balder*, H.-S., Schmett. Eur. i. figs. 384—386 (1847—1850).
- Eumenis balderi*, Hübn., Zutr. Ex. Schmett. figs. 981, 982 (1837).
- var. *magna*, Graeser, Berl. Ent. Zeit. 1888, p. 97.
- MULLA, *Stgr.*, Stett. Ent. Zeit. 1881, p. 270. *Tarbagatai mts., C. Asia.*
- NEVADENSIS, *Feld.*, Reise Nov. Lep. iii. p. 489, pl. lxxix. figs. 4, 5 (1867), (*Chionobas*).
- Æneis gigas*, Butl., Cat. Sat. B. M. p. 161, pl. ii. fig. 2 (1868); Edw. Butt. N. A. ser. ii. *Chionobas*, i. figs. 5, 6, ♀; id. ii. figs. 1, 2 ♂.
- Chionobas californica*, Bdv., Lep. Cal. p. 62 (1869); Edw. Butt. N. A. ser. ii. *Chionobas*, ii. figs. 3—6.
- Chionobas iduna*, Edw., Butt. N. A. ser. ii. *Chionobas*, i. figs. 1—4 (1874). *California (Mendocino County).*
- MACOUNII, *Edw.*, Can. Ent. xvii. p. 74 (1885); Scudd. Butt. N. E. iii. p. 1775 (1889); Fletcher, Rep. Ent. Soc. Ont. 1888, p. 76 (1889). *Nepigon, Lake Superior.*
- BUDDHA, *Grum-Grshimailo*, Hor. Ent. Ross. xxv. p. 458 (1891); Leech, Butt. China, &c., p. 76 (1892). *Mts. of Koko Nor.; N. E. Tibet.*
- TARPEIA, *Pallas*, Reise, &c., i. (1771); Esp. Schmett. i. 2, pl. lxxxiii. figs. 1, 2 (1783); Hübn. Eur. Schmett. i. figs. 779—782 (1824—1826); H.-S. Schmett. Eur. i. figs. 61—64 (1843, 1844). *S. E. Russia to N. Asia, lat. 50° N. to 57° (Trybom).*
- celimene*, Cram., Pap. Exot. iv. pl. cclxxv. figs. E, F (1782), (*Papilio*).
- AELLO, *Esp.*, Schmett. i. 2, pl. cxv. fig. 1 (1800?); Hübn. Eur. Schmett. i. figs. 519—521 (1800—1823). *Alps of Central Europe.*
- norna*, Hübn., *l. c.*, figs. 141, 142.
- ALBERTA, *mihî*, sp. nov. *Calgary, Alberta Province, Brit. N. America.*

- CHRYXUS, *Doubl. & Hew.*, Gen. Diur. Lep. ii. p. 383, pl. lxiv. fig. 1 (1851), (*Chionobas*); W. H. Edw. Proc. Ent. Soc. Phil. ii. p. 82 (1863); Scudd. id. v. p. 5 (1865); Edw. Butt. N. A. ser. ii. *Chionobas*, iii. figs. 1, 2, 5, 6 (1892). *Rocky Mountains, N. America, from Colorado to Alberta.*
- Chionobas calais*, Scud., Proc. Ent. Soc. Phil. v. p. 7 (1865); Butt. N. E. p. 1777 (1889); Edw. Butt. N. A. ser. iii. *Chionobas*, ii. figs. 3, 4, type (1892). *Rupert House, Hudson's Bay (fide Scudder).*
- IVALDA, *Mead*, Can. Ent. x. p. 196 (1878); Edw. Butt. N. A. ser. ii. *Chionobas*, iii. figs. 1—5 (1879), (? var. prec.). *Sierra Nevada, California.*
- NORNA, *Thunb.*, Diss. Ins. Suec. ii. p. 36, pl. v. fig. 11 (1791), (*Papilio*); Esp. Schmett. i. 2, pl. cviii. fig. 4 (1800); Hübn. Eur. Schmett. i. figs. 763—766 (1824—1826). *Eur. bor. from about 63° N. (prov. Jemtland) to 70° N.; Asia bor. Altai; Alaska bor. (fide W. H. Edw.).*
- Papilio hilda*, Quens., Act. Holm. 1791, p. 272, pl. ix. figs. 7, 8; Stgr. Stett. Ent. Zeit. 1861, p. 355.
- Papilio celæno*, Hübn., Eur. Schmett. i. figs. 152, 153 (1793—1794).
- NANNA, *Mèn.*, Schrenk's Reisen, ii. p. 38, pl. iii. fig. 5 (1859); Stgr. Rom. Mem. sur Lép. vi. p. 200. *Amurland.*
- Æneis hulda*, Stgr., Rom. Mem. sur Lép. iii. p. 149, pl. xvi. fig. 8, ♀ (1887); Graeser, Berl. Ent. Zeit. 1888, p. 98.
- URDA, *Evers.*, Bull. Mosc. 1847, p. 69, pl. ii. figs. 1—4c (*Hipparchia*); H.-S., Schmett. Eur. i. figs. 461—463 (1850); Stgr. Rom. Mem. sur Lép. vi. p. 200 (1892); Graeser, Berl. Ent. Zeit. 1888, p. 98. *Sib. or.; Amur.*
- WALKYRIA, *Fixsen*, Rom. Mem. sur Lép. iii. p. 310, pl. xiv. fig. 4 (1887); Leech, Butt. China, &c., p. 77. *Korea.*
- MONGOLICA, *Oberthür*, Etud. d'Ent. ii. p. 31, pl. iv. fig. 6 (1876), (*Chionobas*). *E. Mongolia.*
- SCULDA, *Eversm., l. c.*, p. 612 (1851), (*Hipparchia (Chionobas)*); H.-S., *l. c.* figs. 613, 614 (1851—1856); Graeser, Berl. Ent. Zeit. 1888, p. 98. *Upper Amur.*
- var. *pumila*, Stgr., Rom. Mem. sur Lép. vi. p. 201.

- FULLA, *Eversm.*, Bull. Mosc. xxiv. p. 614a (1851), (*Hipparchia* (*Chionobas*)); H.-S. Schmett. Eur. i. figs. 615, 616 (1851—1856). *Lake Baikal? Tarbagatai.*
- HORA, *Gr.-Gr.*, Hor. Ent. Ross. xxii. p. 307; Rom. Mem sur Léop. iv. p. 454, pl. xx. fig. 1. *Alai Pamir, Central Asia, 11,000 ft.*
- UHLERI, *Reak*, Proc. Ent. Soc. Phil. vi. p. 143 (1866); Strecker, Lep. p. 28, pl. iv. (1873), (*Chionobas*); Edw. Butt. N. A. ser. iii. *Chionobas*, iii. (1891). *Am. bor. Colorado, Montana, Alberta.*
Chionobas varuna, W. H. Edw., Can. Ent. xiv. p. 2 (1882); id. Butt. N. A. ser. iii. *Chionobas*, iv. (1891). *Dakota.*
- BORE, *Esp.*, Schmett. i. 2, pl. c, fig. 1, pl. cviii. (1790); Hübn., Eur. Schmett. i. figs. 134—136 (1793—1794); Sandberg, Berl. Ent. Zeit. 1885, p. 247 (translation, Holland, Can. Ent. 1891, p. 16). *Lapland.*
Papilio norna, Queens., Act. Holm. 1791, pl. x. figs. 1, 2.
- TAYGETE, Hübn., Samm. Ex. Schmett. iii. Nymph. ix. Oread. D. Nubilæ, 4, figs. 1—4 (1816—1824); id. Eur. Schmett. i. figs. 1025—1028, ? 1841 (*Eumenis? Bootes*). *Labrador.*
Chionobas Bootes, Bdv., Icon. Hist. p. 191, pl. xxxvii. figs. 4—6 (1832); id. H.-S. Schmett. Eur. i. p. 69, pl. lxxx. figs. 391, 392 (1843—1850).
- SUBHYALINA, *Curt.*, App. Ross, 2nd Voy. p. 68 (1835), (*Hipparchia*). *Newfoundland, Labrador; Am. arct. or. to about 67° N.;*
Chionobas taygete, H.-S., Schmett. Eur. i. p. 70, pl. xxiv. figs. 112—115 (1843). *Alaska (fide W. H. Edw.); Asia arct. to St. Lawrence Bay (fide Aurivillius).*
Papilio crambis, Frey., Neu. Beit. v. pl. ccccxl. figs. 3, 4 (1845).
Chionobas also, Möschl. (nec Bdv.), Wien. Ent. Mon. vii. 205 (1863).
Chionobas oeno, Scudd., Proc. Ent. Soc. Phil. v. p. 13 (1865).
Ceneis assimilis, Butl., Cat. Sat. B. M. p. 163, pl. ii. fig. 10 (1868).
Ceneis crambis, Aurivillius, Lep. Vega Exp. p. 76, pl. i. figs. 1, 5, 6.
Chionobas crambis, Edw., Butt. N. A. ser. iii. *Chionobas*, vi. figs. 1—4 (1892).
- SEMIDEA, *Say*, Am. Ent. iii. pl. i. (1828), (*Hipparchia*). *Am. bor. White Mts. North Hampshire; Labrador; Colorado, 12—14,000 ft.*
Chionobas semidea, Scud., Bost. Jul. Nat. Hist. vii. p. 621, pl. xiv. figs. 2—8

- (1863); id. Proc. Ent. Soc. Phil. v. p. 20 (1865); id. Butt. N. E. i. p. 134, pl. i. fig. 9, pl. xi. fig. 3, pl. xxxiii. fig. 4, &c.
- BRUCEI, *W. H. Edw.*, Can. Ent. xxiii. p. 154 (1891), (*Chionobas*); id. Butt. N. A. ser. iii. *Chionobas*, vi. figs. 5—8 (1892). *Am. bor. Colorado, 12—14,000 feet; Alberta, 8—9000 feet.*
- BEANII, *michi*, sp. nov. *Chionobas subhyalina*, Bean, MSS. *Am. bor. Alberta, 8—9000 ft.*
- ANTARCTICUS, *Mabille*, Nouv. Arch. Mus. (3), i. p. 142, pl. x. figs. 5, 6. *Patagonia.*
- VACUNA, *Grum-Grshimailo*, Hor. Ent. Ross. xxv. p. 458 (1891). *Central Asia.*

Æ. jutta.—After examining a series of ten males and seven females from Norway, Sweden, Finland, Esthonia, and Russia, five males and four females from Pokrofska, on the Upper Amur, among which are several sent me by Dieckmann as var. *magna*, Graeser, and a pair from Labrador, six pairs from Laggan, three males and a female from Quebec, I find a great amount of variation both in the expanse, number and size of the ocelli, and in the distinctness and shape of the band on the under side. The Asiatic specimens on the whole are distinctly largest, though not more so than some from Southern Norway. The American specimens average considerably smaller than either European or Asiatic ones, though I have two from Esthonia as small as any of them. I should be able to pick out nine out of ten American specimens by the following characters:—Ground colour of the under side more distinctly freckled on both fore and hind wings, band less distinctly defined, ocelli smaller:—but I do not think that there is any ground for treating the American form as a distinct variety. The sex-mark is very conspicuous in all my fresh males, but least so in the Asiatic ones; the number of ocelli varies from five in the fore wing, of which the one in cell 4 is always the smallest, and usually obsolete; and the largest in cell 2 (very rarely absent) to one; in cell 5; and from 4 in the hind wing, of which only those in cells 2 and 3 are usually present, and always the largest, to none; in those cases where the ocelli are nearly or

wholly obsolete, the fawn-coloured blotches surrounding them are also faint or almost obsolete.

With regard to the habits of this species, I cannot add much to the excellent account given in W. H. Edwards' 'Butterflies of North America' (*l. c.*). I have taken it myself only in Norway, where it is one of the earliest butterflies, and flies in peat-bogs in June. At Laggan it is very abundant in small boggy openings in pine-woods, and is much easier to catch than it appears to be in Canada, as it is not shy, and frequently settles on dwarf willows and flowers; it is in perfection here from about the end of June to the middle of July, from 4000 to 6000 ft.

The variety or aberration *balderi* has the ocelli fewer and less conspicuous than the typical form, and, according to Dr. Staudinger, most specimens from Labrador and Livonia are of this form; but as its transition forms to true *jutta* are numerous, I cannot see any greater ground for retaining this varietal name than I can for var. *magna*.

The clasp-form of this species is of the same general type as that of *Æ. fulla* (fig. 4), as may be seen from Scudder's figure, *l. c.*, pl. xxxiii., fig. 5.

Æ. mulla.—With regard to this insect, I have not sufficient material to judge from, but Dr. Staudinger writes me that it is doubtless distinct from *jutta*, and far more distinct than *bore* from *taygete* or *semidea*; it has been taken, so far as I know, only in the Tarbagatai Mountains, at about 6000—8000 ft. by Haberhauer.

Æ. nevadensis.—After comparing very numerous specimens in my own and other collections from California, Oregon, Washington, and Vancouver's Island, of which the last was sent me by Mr. Fletcher as *gigas*, I cannot allow that the differences relied on by Mr. W. H. Edwards between these *californica* and *iduna* are of any weight, and have no hesitation in uniting these four supposed forms. The habitat of this species is peculiar; I have taken it in Oregon, at about 2000 ft., flying in stony or rocky pine-woods, where there was not much undergrowth. It occurs as high as 7000 ft. on Mount Hood, in the same State, according to Morrison, and is common in the pine-forests of Mendocino County, California.

Æ. macounii.—This remarkable species is so like the

last in size, markings, and general appearance, that I could not have separated; it but for the total absence of the sex-mark in the male, which is so conspicuous in all forms of *nevadensis*. Nepigon, a railway station on the Canada Pacific Railway, at the point where the Nepigon River runs into Lake Superior, is the only spot where it has hitherto been taken by Prof. Macoun, and Messrs. Fletcher, Scudder, and Lyman. Its habits are well described by Mr. Fletcher in the Annual Report of the Entomological Society of Ontario for 1888. It flies most abundantly from about June 28th to July 15th, in open grassy glades surrounded by swampy forest near the river-bank, a mile west of the station, and also less commonly on a rocky ridge north-east of the railway bridge.

I visited Nepigon in the hope of finding it at the end of July this year, on my return from the west; but, though the season was said to be a late one, and I searched both the localities carefully, I did not find a trace of it; so its season must be a short one.

Mr. Fletcher states (*l. c.*, p. 79), that a single female was taken by Prof. Macoun at Morley Alberta, on the foot-hills of the Rocky Mountains; but, in the absence of any confirmation of this statement, I am inclined to think this specimen must have been *C. nevadensis*, to which, indeed, he says it had a great resemblance. Judging from the few females of *Æ. macounii* I have seen, I cannot distinguish between them, and though I am not aware that *C. nevadensis* has been recorded from the Rocky Mountains, or north of the American boundary, I see no reason why it should not occur there. The isolated existence of *Æ. macounii*, which is certainly more nearly allied to *nevadensis* so very far to the east of any recorded habitat, is certainly very extraordinary; but our entomological knowledge of the vast tract of prairie and forest north and west of Lake Superior is so trifling that I have little doubt but that it will be discovered elsewhere.

Æ. buddha is a species recently described by Grun-Grshimailo, from the mountains south-east of Koko-nor, on the borders of Kan-su and North-east Thibet, and, judging from the specimens kindly sent me by M. Alphéraky, is perfectly distinct from any other of the white-veined group, on account of the grey marginal

border of both wings. Nothing is recorded of it beyond the bare description.

E. tarpeia.—This species does not appear to vary to the same extent as many; it has an extremely wide range, from the steppes of South-east Russia, through Southern and Central Siberia to Kiackta, and, according to Trybom, occurs on the Yenesei River, as far north as lat. 57°.

E. aello.—Very little need be said about this well-known species. The great variation which prevails in its size, ground colour, and the number and size of its ocelli, shows that we must be careful not to make too much of specific distinctions based on these characters. According to Frey, our latest good authority on Swiss butterflies, *aello* occurs only in alternate years, in the canton of Berne, in West Switzerland, in the years with even numbers, in East Switzerland in the years with uneven numbers. This is borne out by my own experience, so far as it goes; I took it in the Engadine in 1879 and 1885, in the Valais and Engelberg in 1884. Very probably, however, this rule is not invariable, and that some specimens may be found in the intermediate years. Meyer-dur, however, whose knowledge of the Swiss butterflies is very accurate, seems to have no doubt on the subject.

E. alberta, n. s.

♂. Upper side pale grey-brown, generally with a strong fulvous tinge on the hind wings. Fore wing with the costa from the base pale grey, more or less strongly mottled with black; a rather inconspicuous pale submarginal band, bearing from one to three round black spots or ocelli in cells 2, 3, and 5, of which that in cell 3 is the first, and that in cell 5 the last, to disappear; sex-mark wanting. Hind wing with a more conspicuous pale submarginal band, bearing a round black spot or ocellus in cell 2 (the latter is sometimes wanting, and sometimes attended by a punctiform black spot in cells 3 and 4); fringes chequered. Under side: fore wing pale grey-brown, inclining to whitish round the tip, the costa and the cell mottled with black, the dark mottling in the cell coalescing in various degrees, and sometimes forming a dark transverse bar about the apical third of the cell; a pale submarginal band corresponding with that on the upper side, but having the ocelli more conspicuous, and its inner edge bounded throughout by a well-defined blackish line, which is angularly produced towards the

hind margin on vein 4, about as far as the ocellus in cell 5. Hind wing pale grey-brown, inclining to whitish (sometimes absolutely whitish) on the disc; a broad irregular dark brown median band, sharply defined on both edges, where its colour is intensified, but without any sharply projecting angles; a distinct ocellus (sometimes absent) in cell 2, coinciding with that on the upper side; veins conspicuously whitish. Upper fringe of palpi whitish. Clasp of the *chryxus* type. Exp. 42—44 mm.

Amongst the described species this insect bears the greatest superficial resemblance to *Æ. taygete*, from Labrador, but the latter is larger, non-ocellate, and normally has a conspicuous sex-mark in the ♂.

I found three males of this species in a small collection made by Mr. F. H. Wolley-Dod, near Calgary, in 1893. In the same collection were specimens of *varuna*, of which at first I thought it might possibly be a variety, but as Mr. Wolley-Dod assured me that it appears three weeks earlier than the latter in the same localities, and being in perfection on May 16th, whilst *varuna* was not out till about June 11th.

Mr. J. Edwards finds that the clasp-form is very different, and as the band of the under side in the three specimens also constantly differs from that of *varuna*, I think there can be no doubt that it is a good species. I cannot believe that this insect is confined to this locality, which is of a thoroughly prairie character, forty miles from the true base of the mountains, and has an extremely cold winter and warm summer; but the very early appearance of the insect probably accounts for its not having been found before by one or other of the few entomologists who have crossed the continent in this latitude.*

Æ. chryxus.—A very abundant species both in Colorado, from about 9000—12,000 ft., and in the Rocky Mountains, from 4000—7000 ft., coming out at the end of June and in July. It was just appearing at 6000 ft. when I left the Yellowstone on June 15th. It is a woodland rather than an alpine species, frequenting rocky hill-sides among conifers, and settling, usually, on a

* Since this was written I have found, in the British Museum, a male, taken at Moosejaw, a station on the Canada Pacific Railway, 400 miles east of Calgary, by the Rev. J. H. Keen, on May 12th, 1890, which is much smaller, but otherwise agrees with *alberta*.

fallen log or tree-trunk, with the wings closed, when disturbed; but it also occurs above timber line, as high as 13,000 ft., in Colorado, later in the season, and these high-level specimens seem smaller and darker than the others. It is very variable in size, tint, and ocellation. I was inclined to think that *Æ. ivallda* was a pale form of this, as I could not see any distinction but that of colour. Prof. Owen, of Madison, Wisconsin, however, who has taken both, assures me that the habitat and flight of the two differ; and, as the geographical range of *Æ. ivallda*, which, as far as we know, is confined to the Sierra Nevada, in Placer County, California, and about Lake Tahoe, is quite distinct from that of *chryxus*, which is not known to occur west of the Rockies, in the United States; it may probably be looked on as a constantly distinct species, though there is nothing in the form of the clasp to distinguish between the two forms.

Æ. norna.—This is one of the most variable of all the genus, both in size, colour, and ocelli. It is found all over Scandinavia, as far south as Jemtland, where I have taken it in open marshy forests; it has in all cases a distinct sex-mark, which is usually very conspicuous; the ocelli vary from four in the fore wing to more, and the variety called *hilda*, which has but one ocellus on each wing, is hardly worth a name. Some of the specimens taken by Schoyen, on the Porsanger fiord, are very small and pale, almost without ocelli, and might be mistaken for transition forms from this species to *fulla*; others from the Altai Mountains, taken by Ruckelberg, do not differ much from large Swedish specimens, though variable in colour.

In 'Canadian Entomologist,' 1886, p. 16, Mr. W. H. Edwards records three females from Northern Alaska, one of which, being sent to Dr. Staudinger, was considered, "as far as I can judge from this one bad specimen, to be a dark variety of *norna*." There would be nothing improbable in this, but the identification is as yet hardly satisfactory.

Æ. nanna.—This species, described by Ménétries from the Amur, had long been confused with *urda*, but the numerous specimens collected by Graeser at Pokrofska, on the Upper Amur, have enabled Dr. Staudinger to recognise it; and, though I had two specimens for some time mixed with *urda*, I now see that it is distinct by

reason of the well-defined sex-mark, which is never found in *urda*, and the want of the black line on vein 4 of the fore wing, which is found in the latter species. Graeser says that *nanna* only flies in very boggy meadows, and never settles on plants, but only on the ground in the muddy spots between the clumps of grass; whilst *urda* is found on stony slopes thinly covered with vegetation, and prefers to sit on the flowers and leaves of low plants.

Æ. urda is a very variable species, and apparently by far the most generally distributed species in Amurland; in colour it ranges from dark rufous brown to pale yellowish brown, and though the ocelli are usually well marked, in some cases they are faint or wanting.

Æ. walkyria.—I can add nothing to what has been said about this very distinct species by Fixsen; it has hitherto only been found in Korea by Herz, at about 3000 ft.

Æ. mongolica.—This species has remained unknown, except from the excellent figure and description given by M. Oberthür. Owing to the kindness of this gentleman I have been able to inspect one of the original specimens taken by the Abbé David in the mountains of Mongolia. It is strikingly different from every other species known to me, except *walkyria*, on account of the fringe, which, like that of *walkyria*, is absolutely unchequered; and I notice that it differs from the latter, of which I have one male and two females, kindly lent to me by the Grand Duke Nicolas Mikhailovitch for comparison, in the following particulars:—The general coloration is paler and more yellow; vein 4 of the fore wing is not heavily marked with brown; and, if I can judge from the description of the female given by M. Oberthür, the ocellus in cell 2 is not so conspicuously larger than the other as it is in the female of *walkyria*. Though I should not venture to form a decided opinion as to the distinctness of these two species on such scanty material, yet I think that the two are certainly nearly allied, and though, as far as at present known, distinct in their habitat, yet they may one day be connected by intermediate varieties. So far as the clasp-form of *mongolica* can be examined without dissection, it appears to agree with that of *walkyria*.

Æ. sculda —The true *sculda* is a species which I have

only recently identified from specimens sent me by Dr. Staudinger, and which agrees exactly with one of the cotypes which I had previously received from the St. Petersburg Museum, and had treated as an abnormal form of *urda*. The type came from near Kiackta, and it has more recently been found by Graeser in marshy larch-woods at Pokrofska.

Æ. fulla.—This species, which was described by Eversmann from the mountains round Lake Baikal, has more recently been taken by Haberhauer on the southern slopes of the Tarbagatai (see Staudinger, Stett. Ent. Zeits., 1881, p. 271). The latter considers it as a form of *norna*, from which, however, it may always be distinguished by the clasp-form. It is very distinct in appearance from typical *norna*, but it might easily be confounded with small pale specimens of the latter, of which I have one from South Lapland, and have seen others taken by Schoyen on the Porsanger fiord, particularly when these have the sex-mark almost obsolete; but the two species may be readily separated on a comparison of the clasp-form, which in some cases may be effected without dissection, if some of the long scales at the apex of the abdomen be removed, either by scraping with a pin, or rubbed off with a moistened camel's-hair pencil, when it may be seen that the clasp in *norna* is suddenly narrowed about the middle, the apical part being about one-third as wide as the basal part; the apex (viewed from the side) is narrowly rounded, and the teeth on the upper edge extend backward but a little way from the apex; in *fulla*, however, the clasp is gradually, not suddenly, narrowed, the apex (viewed from the side) appears obliquely subtruncate, and the teeth on the upper edge extend almost to the base of the clasp, as visible *in situ* (see fig. 4).

Æ. hora.—This species, described from the Alai Valley of Eastern Turkestan, where it was taken at 11,000 ft. elevation by Grum-Grshimailo, and afterwards more numerous by the same gentleman in the southern part of the Thian-shan Mountains, is very like *fulla*; but may be separated not only by the differences given in the conspectus (*vide infra*), but by the different shape of the clasp (see fig. 7).

Compared with my specimens, which were taken by M. Grum-Grshimailo at Thian-shan, the figure of this

species (*l. c.*) is not characteristic, so far as regards the shape of the outer edge of the dark band on the hind wing below; in my specimens the two points at which the outer edge of this band is farthest from the base of the wing occur on vein 4 and in cell 6, the space between them being concave; in the figure, however, the outer edge of the band bulges outward in an almost even curve from vein 2 to vein 7. That this is a mere error of the artist seems clear from the representation of the hind wing above, because there the outer edge of the band (which in these insects always coincides with that on the lower surface) shows the projection on vein 4, and, in a less degree, that in cell 6. It is possible that the specimen figured may have been an aberrant one, in which the outer edge of the band on both hind wings below was not symmetrical, but in any case there seems no reason to think that the figure is intended to represent a species different from that to which my specimens belong.

Æ. uhleri. — I cannot add much to the excellent account of this species given by W. H. Edwards (*l. c.*). I took it in Colorado, in the first week in July, in the drier valleys, at about 9—10,000 ft. elevation; it was flying at the same time on the foot-hills near Denver. I have also taken it in the Yellowstone Park, at 7000 ft., in June. The form *varuna* was originally described from Dakota and Montana, where it was taken by Morrison in 1881, and appears to be essentially an insect of the northern plains and prairies, and though it enters the foot-hills of the isolated mountain ranges of Montana and Dakota, neither Messrs. Wright, Morrison, or Bean have taken it in the mountains. In Alberta and Saskatchewan, Mr. Bean has taken it abundantly between the 1st and 8th June, as well as at McLean and Swift Current in Assiniboine; and Mr. Wolley-Dod finds it at Calgary in the early summer. In the Rocky Mountains of Alberta it goes up to about 4000 ft. at Kananaskis, where the valley of the Bow River runs into the mountains; it has also been taken by Mr. Fletcher at Fort McLeod.

In examining a large series it is impossible to separate the two forms, although, as a rule, the Colorado specimens are larger and paler than those from the north, and the prairie form *varuna* is smaller. The ocelli on the

hind wing are frequently absent in both sexes, and in these there is only one ocellus on the fore wing.

Æ. bore.—With regard to the specific distinction of the European *bore* and Labrador *taygete*, I can only say that extreme examples of both might be separated on account of the generally darker colour, and more distinct band on the under side of the hind wing in *taygete*; yet, according to Dr. Staudinger, it is absolutely impossible to separate the latter as a species, and Mr. J. Edwards finds the clasp-form of both identical. For a full account of the habitat and larva of *bore*, see Sandberg (*l. c.*).

Taygete seems to be the commonest species in Labrador (*cf.* Möschl.), and, like *bore*, is found on the sandy coast of an Arctic sea. It is quite probable that one or other form exists on the coast of Siberia and America, but so far I have seen no specimens from other localities.

Æ. semidea.—This species has been so completely described by Scudder (Butt. New Eng., i., p. 134) in its White Mountain habitat that I need say nothing more of it here; but I am still in great doubt as to its distribution in other localities, because, though stated by Möschler to occur in Labrador, where he says it is much rarer than *taygete* and *crambis*, I have no specimens from that locality which I can identify certainly with *semidea*, and what he called *semidea* from Labrador may have been what I call *subhyalina*.

As, however, I have examined a specimen in Mr. Lyman's collection, from Hudson Strait, which is certainly *semidea*, I have no doubt of its existence in Labrador, though I am unable to give any certain characters other than those taken from the clasp, by which it may be distinguished.

All authors who have as yet examined specimens of the form occurring in Colorado seem to agree in identifying them with the typical White Mountain *semidea*; but, on carefully comparing a series of five pairs from each locality, carefully selected from all I have on account of their perfection, I can certainly pick out the Colorado specimens by the following characters:—On the under side more or less distinct white dots ringed with brown, hardly worthy of the name of ocelli, are present on the fore and hind wings in every specimen, and are quite well marked on the fore wing of the female; whilst in the White Mountain specimens the ocelli are so faint as to be hardly

perceptible, and in most cases entirely absent. In the female the general tint of the under side is much more ochreous, and in both sexes the freckling of the fore wing, instead of being principally confined to the apical and costal areas, is more spread over the whole of the wing.

Though I am not prepared to say that these characters are sufficient to distinguish the form specifically, yet, considering the widely separated habitat of the Colorado form from that of the White Mountain one, and the marked difference in its climate and vegetation, I certainly think there is good ground for looking on it as an incipient species. I have taken this form on the mountains round the head of Hall's Valley, in Clear Creek County, Colorado, at the same time and elevation as the following species; it is by no means so abundant, however, and seems to fly somewhat earlier, as most of the fresh specimens I got were females. In its habits and flight it is like *brucei*. Scudder records its presence on many other peaks and passes of Colorado, at 12—14,000 ft., as far south as Sierra Blanca, the southern extension of the Sangre de Christo range in 37° 30' N. It is quite likely that it exists on the high peaks of Montana, but has not yet been discovered there.

In the British Museum are several specimens from various parts of Arctic America, which are very puzzling, and which I am not able to identify with certainty without closer examination of the clasps than is possible: four specimens from Winter Cove and Cambridge Bay, collected in 1885 by the Arctic Expedition under Captain Collinson, all of which are distinctly banded, and, in my opinion, are *subhyalina*; one from the same locality, which has no band, and may be *semidea*; two females from Repulse Bay, of which the one marked type has the band faint, the other has it more distinct, whilst the third is intermediate; and a male and female from Sir J. Richardson, taken in 67½° N. lat., which agree better with *taygete*.

Æ. brucei.—I cannot add much to the account given by Mr. Bruce of the habits of this insect, quoted by W. H. Edwards. During my visit to Colorado this year I was able, under his guidance, to catch a great number of this species during the first week in July. The weather, being extremely fine and hot, and the ground over which

the insects fly easy to run upon, there was no difficulty in taking a large quantity. The amount of variation is not great, though the general appearance and band of the under side of the hind wing bring this species uncommonly close to some specimens of *taygete* from Labrador; yet I agree with W. H. Edwards in considering it distinct by reason of the absence of the rufous tinge, which that species shows on both surfaces. A few specimens of *brucei* have been taken by Mr. Bean on a mountain close to the Kicking Horse Pass, at about 8000 ft., but it seems to be comparatively rare there. It will no doubt turn up in other parts of the Rocky Mountains.

Æ. subhyalina.—I have had more difficulty in dealing with the synonymy of this species than any other, but after having compared the unique type of *subhyalina*, Curt., in Guénéé's collection, kindly lent me by M. Charles Oberthür, the figure of *crambis* given by Freyer, the type of *assimilis* in the British Museum, from Repulse Bay, and several other specimens in the British Museum from various parts of Arctic America, as well as one from Hudson's Straits, lent to me by Mr. Lyman, of Montreal, I have come to the conclusion that it is impossible to distinguish more than one species. It is true that the variation in size, colour, and distinctness of the band on the hind wing below is great, but not greater, or even so great, as that found in some other species I have already dealt with; and, considering that all these supposed species occur in comparatively limited areas of Arctic America, which are very similar in point of climate, it would be more surprising if several species were found than only one, because there is hardly a case in which an essentially Arctic species like this has not a very wide range; this opinion is confirmed by Mr. J. Edwards' examination of the clasps of some of the specimens differing most remarkably in appearance, including the type of *subhyalina*, in which, fortunately, a critical examination is possible without dissection. Several authors, including such good authorities as Möschler and Staudinger, have treated a species occurring in Labrador as *semidea* of Say, the typical habitat of which is in the White Mountains of New Hampshire. The latter species can be certainly distinguished from *subhyalina*, as Mr. J. Edwards has shown, by the form of the clasp (figs. 5, 9), and usually by the less distinctly

defined band of the hind wing below; but I have no Labrador specimens in my collection of true *semidea*, though one lent me by Mr. Lyman, from Hudson Strait, is proved by the clasp-form to be that species, and it therefore doubtless occurs in Labrador as well. *Subhyalina* appears to be commonest in Labrador and Newfoundland, whence I have seen very large specimens in Mr. Godman's collection. It may also be distinguished from *semidea* by the more rufous tinge of the fore wing below, and by the almost invariable presence of some white spots, rarely amounting to ocelli, on the under side. The clasps and tegumen of this species are figured by Aurivillius in the plate to his paper on the Lepidoptera of the Vega Expedition; his fig. 6, that of the parts seen from above, is recognisable, but fig. 5, that of the parts seen from the side, is not satisfactory, because the drawing is too small to allow a proper expression of the character of the clasp; the contour of the latter is well enough, but its apex is represented as simply acuminate.

Æ. beanii, n. s.

♂. Wings subdiaphanous, very sparsely scaled. Upper side uniform rather pale smoky brown; costa, from the base, very narrowly pale grey, mottled with black; sex-mark present but indistinct. Under side: fore wing as above, but with costa narrowly, and the tip broadly, pale grey, mottled with blackish brown. Hind wing pale grey, closely mottled with blackish brown, the general direction of the dark markings being from the costa to the inner margin; fringes chequered. Entire clothing of the palpi blackish. Clasp of the *semidea* type.

♀. Similar but slightly larger. The hind tibiae thickened and curved inwards at the apex; the basal joint of hind tarsi dilated and laterally compressed. Exp. ♂ 46 mm., ♀ 52 mm.

This very distinct species is most nearly allied to *Æ. semidea*, from which it is easily distinguished by the blackish (instead of white) upper fringe of the palpi, the smoky colour of the upper side, and the absence of any tendency to the formation of a dark band on the under side of the hind wing. The modification of the hind tibia is a structural character, which will also distinguish this species from any of its allies, though we have hitherto critically examined a single female only.

This species was discovered by Mr. Bean at Laggan three or four years ago, and has been sent out by him under the name of *subhyalina*. It is, however, perfectly distinct from that species, as we have shown above. This species appears, as far as I know at present, to be confined to the bare rocky summits of the mountains at 8—9000 ft. elevation. Under Mr. Bean's guidance I spent three days hunting for it, but, though it had then been flying for at least a week, and was tolerably numerous, I was, owing to the extreme difficulty of the ground, only able to take five or six males. The insect frequents the piles of broken rock which surround and frequently cover the summits of these mountains; its flight, like that of most of the genus, is not particularly strong, but, owing to its shyness and the difficulty of approaching it within reach, it is very hard to secure. It rarely comes out on to level ground, or far from its strongholds, and only flies in the sun when the wind is not too strong. The males come out from the 15th to the 20th July, and the females a week or ten days later. Mr. Bean has not yet discovered the food-plant of the larva, and though old pupacases, which look like those of a Satyrid butterfly, are not rare under the stones where it occurs, he has never found a living pupa. Amongst a large series collected by Mr. Bean, I noticed a certain amount of variation on the under side, but the dark smoky appearance of the insect will separate it at once from any other known to me.

I transcribe below the original diagnoses of the two species which I have not been able to examine:—

Æ. antarcticus. — “Statura parva: alæ fusco-rufæ: antice puncto apicali nigro, et radiis obscure fulvis inter ramos nervorum; posticæ radios habent lineola nigra distinctos. Subtus alæ posticæ fuscæ, fascia media in virgulas nigras fracta.

“Une femelle prise à Santa Cruz.” (A river and port on the east coast of Patagonia in lat. 58° S.).

Mr. J. Edwards made the following note on the figure of the above, which appears to be a true *Æneis*:—

Expanse, 35 mm. Upper side: fore wing with a black spot in cell 5; hind wing with black spots in cells 2, 3, 4, and 5. Under side of hind wing dark brown from the base to the outer edge of the dark band; the latter starts about the middle of the costa, and

proceeds outwardly to a point on vein 4, about one-third from the hind margin, whence it passes obliquely to near the anal angle.

E. vacuna.—"Supra alis fulvis, late nigro fusco marginatus, serie punctorum; anticarum quatuor, posticarum quinque coracino-nigrorum ornatis et lutescenti ciliatis. Subtus alis anticis fulvescentibus, in cellula media, ad costam et apicem fusco strigulatis, nervis albidis; posticis albido-rosaceis, dense fusco-strigulatis, limbo medio obscuriore et ad marginem externum distincte dentato, nervis albis; punctis alarum omnium nigris, distinctissimis. ♂, 19 mm.

"Specimen unicum imperfectum in montibus ad Dongar-tschen detectum."

This species evidently belongs to the ocellate, white-veined group, in which it is distinguished by its small size.

The following "Conspectus" has been prepared by Mr. J. Edwards for his own use in working at my specimens of this genus; the characters employed will *not* be found absolutely diagnostic in the case of every individual specimen, but the table will serve to show what points have proved most useful in separating the members of this admittedly difficult genus.

CONSPECTUS SPECIERUM.

- | | | | |
|---|-------|--|-------------------------|
| 1 | (36). | Ocellate species, <i>i.e.</i> , having at least one distinct roundish black spot or ocellus (or indication of such) on fore wing below.* | |
| 2 | (9). | Hind wing below with the veins conspicuously whitish.† | |
| 3 | (4). | Fore wing below with a broad dark grey marginal band, bounded inwardly by a blackish line. No sex-mark in ♂ | <i>buddha</i> , Gr.-Gr. |
| 4 | (3). | Fore wing below with the marginal band (if any) not bounded inwardly by a blackish line. | |
| 5 | (6). | Fore wing below normally with 4 subequal ocelli. No sex-mark in ♂ | <i>tarpeia</i> , Pall. |

* In some specimens of *bore* a weak ocellus is present on the fore wing below in cell 5, and, very rarely, in cell 2.

† Certain specimens of *hora* have the veins paler than others, but in that species the dark band on the hind wing below is produced into a blunt point on vein 4 and in cell 6. *E. sculda* also is more or less white-veined, but the characteristic shape of the dark band on the hind wing below, with its projecting tooth on vein 4, as in *urda*, and the yellowish rust-red colour of the fore wing, prevent its confusion with any species in this section.

- 6 (5). Fore wing below with ocelli normally absent from cells 3 and 4; never present in cell 4, and but rarely in cell 3.
- 7 (8). ♂ with a sex-mark. Hind wing below generally evenly mottled, the dark band scarcely defined *aello*, Hübn.
- 8 (7). Sex-mark wanting. Hind wing below with a sharply defined dark band *alberta*, n. s.
- 9 (2). Hind wing below with the veins sometimes in part, but not conspicuously, pale.
- 10 (33). Hind margin of hind wing practically even,
- 11 (14). Hind wing below with the dark band not bordered outwardly with white or whitish grey.
- 12 (13). Fore wing above with the pale submarginal band suffused, reduced to a series of spots, or absent; an ocellus (rarely wanting) in cell 2 of fore wing below *jutta*, Hübn.
- 13 (12). Fore wing above with the pale band sharply defined on its outer edge, the marginal grey-brown band of even width throughout; an ocellus in cell 2 of fore wing above, but not below *nulla*, Stgr.
- 14 (11). Hind wing below with the dark band bordered outwardly with white or whitish grey.
- 15 (22). ♂ with a distinct sex-mark.
- 16 (21). Hind wing below with at most one black spot or ocellus in cell 2.
- 17 (20). Fore wing very pointed. Clasp with a large projection before the middle of its upper edge. Species inhabiting America.
- 18 (19). Ground colour of upper side bright fulvotestaceous *chryxus*, Doubl.
- 19 (18). Ground colour of upper side grey-brown .. *ivallda*, Mead.
- 20 (17). Fore wing less pointed. Clasp without any projection near the middle of its upper edge. Species inhabits Europe *norna*, Thunb.
- 21 (16). Hind wing below with 3 or 4 distinct black spots or ocelli *nanna*, Mén.
- 22 (15). Sex-mark wanting, or very indistinct.
- 23 (26). Fore wing above with vein 4 broadly black.
- 24 (25). Fringes distinctly chequered. Ocellus rarely absent from cell 5 of fore wing *urda*, Eversm.
- 25 (24). Fringes dirty whitish grey, not chequered. The ocellus in cell 5 of fore wing very feeble or absent, that in cell 2 very strongly developed, especially in the female *walkyria*, Fxix.
- 26 (26). Fore wing above with vein 4 not broadly black.

- 27 (28). Fringes not chequered, dirty whitish grey. Upper side bright tawny yellow. Fore wing with two ocelli, 1 each in cells 2 and 5 (the former the larger) both above and below; hind wing above with 4 subequal ocelli in cells 2—5, below with a black point in cell 2 *mongolica*, Ob.
- 28 (27). Fringes distinctly chequered.
- 29 (32). Hind wing below with the dark band sharply defined, its outer edge angularly produced on vein 4 and in cell 6.
- 30 (31). Fore wing above with a well-defined broad pale ochreous submarginal band, which is distinct towards the costa beyond cell 5. Fore wing below with the dark band from the costa cut short by vein 4. Clasp (fig. 4) subtruncate at the apex, its upper edge strongly serrate for more than half its length *fulla*, Eversm.
- 31 (30). Fore wing above with the pale region suffused, most distinct towards the inner margin. Fore wing below with the dark band from the costa always continued beyond vein 4, generally reaching the inner margin. Clasp (fig. 7) broadly rounded at the apex, its upper edge not evidently serrate *hora*, Gr.-Gr.
- 32 (29). Hind wing below with the dark band not often distinctly traceable, and never produced into two teeth on its outer edge.. *uhleri*,* W. H. Edw.
- 33 (10). Hind margin of hind wing rather strongly scalloped. Large bright fulvous species.
- 34 (35). ♂ with a sex-mark *nevadensis*, Feld.
- 35 (34). Sex-mark wanting *macounii*, W. H. Edw.
- 36 (1). Non-ocellate species.†
- 37 (42). Texture and scaling of wings normal.
- 38 (41). ♂ with a sex-mark.
- 39 (40). Hind wing below with the veins not conspicuously whitish; inner edge of the dark band generally ill-defined *bore*, Esp.
- 40 (39). Hind wing below with the veins conspicuously whitish; both edges of the dark band well-defined *taygete*, Hübn.
- 41 (38). Sex-mark wanting. Fore wing, especially below, inclining to reddish brown. Clasp (fig. 6) strongly curved inwards at the apex, the teeth on its upper edge almost confined to the upper apical angle, which is somewhat produced *subhyalina*, Curt.

* Specimens with a more or less evident dark band on hind wing below and fewer ocelli are *varuna*, W. H. Edw.; those with the band disintegrated and more numerous ocelli are *uhleri* proper.

† *Vide* note to par. 1, p. 478, *supra*.

- 42 (37). Wings subdiaphanous, grey-brown or smoke-brown; scaling very sparse.
- 43 (46). Upper fringe of palpi white or whitish. Hind tibiæ of female simple.
- 44 (45). Hind wing below with the inner edge of the dark band undefined. Clasp (fig. 5) not curved inwardly at the apex, which is bluntly rounded, and, together with the upper edge nearly or quite to the middle, bears unequal and comparatively large teeth *semidea*, Say.*
- 45 (44). Hind wing below with the inner edge of the dark band sharply defined. Clasp of the *subhyalina* type *brucei*, W. H. Edw.
- 46 (43). Upper fringe of palpi black or blackish. Female with the hind tibiæ thickened and curved inwards at the apex, and the basal joint of the hind tarsi dilated and laterally compressed *beanii*, n. s.

EXPLANATION OF PLATE XV.

- FIG. 1. Clasp of *Æ. uhleri*.
2. ,, ,, *alberta*.
3. ,, ,, *chryxus*.
4. ,, ,, *fulla*.
5. ,, ,, *semidea*.
6. ,, ,, *subhyalina*.
7. ,, ,, *hora*.
8. ,, ,, *beanii*.
9. ,, ,, *semidea* (Colorado form).
10. ,, ,, *bore*.
11. Hind tibia and tarsus of *Æ. beanii*, ♀.
12. ,, ,, ,, ,, *semidea*, ♀.
13. Clasp of *Æ. norna*.

* Specimens of *semidea* from Colorado differ from the typical form in the decidedly reddish ochreous tinge of the under side, the presence of a small feeble ocellus in cell 5 or cells 2 and 5; and in the two specimens examined the teeth of the clasp (fig. 9) are larger and fewer.